Pierce Math League - Problem Solving - march 2020_3

Topic 1: Four Step Method for Problem Solving

[1] FIND OUT

What is the question that you have to answer?

What information does the question give you?

[2] CHOOSE A STRATEGY

Possible Problem Solving Strategies

MAKE A TABLE/GRAPH/CHART	MAKE AN ORGANIZED LIST
GUESS & CHECK	USE OR LOOK FOR A PATTERN
MAKE IT SIMPLER	USE LOGICAL REASONING
MAKE A PICTURE OR DIAGRAM	WORK BACKWARDS

[3] ESTIMATE, CALCULATE & SOLVE

Can you make an estimate of the answer?

Work through the problem until you find an answer with your chosen strategy.

Record your work so that you can see quickly what you have completed.

[4] REVIEW

Does your solution make sense?

How close is the solution to your estimate?

Make sure that your solution answers the question that is given.

Topic 2: Counting

If one were asked, ‘How many numbers are in the series of counting numbers: 1,2,3,4,5,6,7,8,9,10?’ One could either count each element of the series, or, realize that the series is the first 10 counting numbers and answer, ‘10’.

If one were asked, ‘How many numbers are in this series: 2,4,6,8,10,12,14,16,18,20?’ One could count each element of the series to determine the total. Or, one might determine that this series consists of consecutive even numbers. If one were to divide each element of this series by 2, one could *transform* this series into the series of the first 10 counting numbers (as in the first example).

Practice Problems:

[1] How many whole numbers are there from 34 to 117 inclusive (i.e. including 34 and 117)?

[2] How many numbers are in the following series: 5.7, 11.7, 17.7, 23.7, …, 119.7, 125.7?

Topic 3: Power of Doubling

Review powers of 2: $2^0 = 1$; $2^1 = 2$; $2^2 = 4$; $2^3 = 8$; $2^4 = 16$; $2^5 = 32$; $2^6 = 64$; $2^7 = 128$; $2^8 = 256$; $2^9 = 512$; $2^{10} = 1024$

Facts to know: $2^{10} \sim 1000$; $2^{20} = 2^{10} \times 2^{10} \sim 1000000$

Topic 4: Miscellaneous Problems

[3] Lauren plays basketball with her friends and makes 10 baskets. If each basket is worth either 2 or 3 points, and Lauren scores a total of 26 points, how many baskets worth 3 points did she make?

[4] An equal number of nickels, dimes, and quarters has a total value of $9.20. What is the total value of the quarters?

[5] How many times does a digital clock display a time in which the sum of the digits equals 6 between 12am (midnight) and 12pm (noon)?

[6] What is the sum of the consecutive whole numbers from 153 through 376 inclusive?

[7] On the planet Pentundecia, there is an unlimited supply of 5-cent and 11-cent coins, but there are no other coins whatsoever. What is the largest amount of money that a Pentundecian can NOT exactly make? (For example, a Pentundecian cannot make 4 cents.)